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BLACK PORTUGUESE MILLIPEDES & SLATERS FACT SHEET



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MILLIPEDES AND SLATERS IN NO-TILL SYSTEMS

The black Portuguese millipede is emerging as a sporadic but damaging pest of broadacre agriculture, particularly canola, while high populations of slaters have damaged some crops in recent years.



PHOTOS: © NICK MONAGHAN, LIFEUNSEEN.COM

Black Portuguese millipedes (left) and slaters (right) generally feed on organic matter, however their populations and the incidence of crop attack has increased in recent years.

KEY POINTS

- Black Portuguese millipede damage to emerging canola plants has increased in recent seasons.
- Rises in populations have been linked to increased uptake of no-till and stubble retention.
- Reducing paddock stubble loads over summer will generally reduce millipede numbers.
- Slaters can cause extensive crop damage to emerging seedlings.
- The *Australiodillo bifrons* slater species has the ability to swarm over a soil surface.
- Finding black Portuguese millipedes and slaters in a crop does not necessarily mean damage will occur.
- Management options are limited after crop emergence so prevention is a key part of control.

BLACK PORTUGUESE MILLIPEDES

In the past five to 10 years, damage caused to some broadacre crops by black Portuguese millipedes (*Ommatoiulus moreleti*) has been increasing.

The increase has been linked to stubble retention, no-till farming practices and improvements in soil organic matter, which have provided a more favourable habitat for millipedes to survive and reproduce. Recent wet summers have contributed to a population build-up in some parts of southern Australia while planting of more vulnerable crops has led to increased damage.

The species

The black Portuguese millipede is native to Europe and has been accidentally introduced to other countries, including Australia, where it is now common in South Australia, New South Wales, Victoria, Tasmania and Western Australia.

The smooth, cylindrical body of the black Portuguese millipede distinguishes it from other native species, which often have rougher and more uneven bodies. They are part of the same family as

several native Australian millipedes and centipedes called myriapods, meaning 'many-legged'. Measuring 30 to 45 millimetres, adult millipede bodies consist of up to 50 segments with each segment having two pairs of legs. When disturbed, they either curl up in a tight spiral or thrash to escape.

Native millipedes are widespread in low numbers but black Portuguese millipedes are found in large numbers and are quite mobile for their size, especially after opening autumn rains. They can move several hundred metres in a year.

They are transported between properties and to new regions in plant material, infested soil and farm machinery.

Life cycle

Black Portuguese millipedes start mating in March and April and lay most of their eggs in April and May. Mature females lay about 200 yellowish-white eggs the size of a pinhead in a small hole they make in the soil.

An immobile, legless stage hatches from each egg and develops into the first active stage of the life cycle after about one week. This first stage has only three pairs of legs.

Millipedes grow through a series of moults. At each moult, the millipede adds more legs and body segments until it is mature.

During the first year of life, millipedes are quite small and easily overlooked. After the first year, juveniles have reached the seventh, eighth or ninth stage of development and will be about 1.5 centimetres long. After this, they only moult in spring and summer.

During moulting, millipedes are vulnerable because the new cuticle (outside skin

layer) is soft and easily damaged when first formed. Black Portuguese millipedes usually mature after two years when they are in the tenth or eleventh stage of growth.

Habitat

Millipedes feed on leaf litter, damp and decaying wood, fungus and vegetable matter like tender roots, mosses, pollen or green leaves on the ground. They can play a role breaking down organic matter in the soil.

As a result, they occur in greater numbers in undisturbed leaf litter and organic mulch and in areas where winter weeds, such as sour sobs and salvation jane, form a mostly continuous ground cover. Millipedes are not numerous in cultivated areas or bare ground.

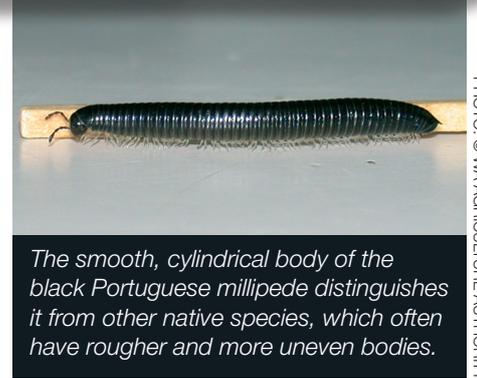
Crop damage

Since black Portuguese millipedes generally feed on organic matter, crop feeding damage is relatively rare and unusual.

Black Portuguese millipedes occasionally attack living plants by chewing the leaves and stems. It has been suggested that millipedes feed on crop plants when they are seeking moisture but this has not been confirmed.

Most reported millipede damage has occurred in emerging canola crops on black organic soils with heavy stubble loads, although damage has also been observed on lighter soils.

In canola, millipedes remove irregular sections from the leaves and can kill whole plants if damage is severe. Damage to cereals can also occur where the stems of young plants are chewed.



The smooth, cylindrical body of the black Portuguese millipede distinguishes it from other native species, which often have rougher and more uneven bodies.

PHOTO: © WA AGRICULTURE AUTHORITY 2003

In the southern region, damage has been reported in the medium and high rainfall zones including near Wagga Wagga and Henty in New South Wales; the Mid North, Yorke Peninsula and Kangaroo Island in South Australia; and the Western Districts and Wimmera areas of Victoria. In many cases, damage has been worst in areas with high volumes of retained stubble or where plant matter from the previous year was present.

The presence of black Portuguese millipedes does not always result in damage. There have been many instances where no damage has occurred despite large millipede populations. Millipedes are mostly active and feed at night, which is the best time to check if they are causing damage to canola plants.

Management

Control options for millipedes are limited but there are some measures that will curb populations.

Chemical

There are no insecticides registered to control millipedes in broadacre agriculture.

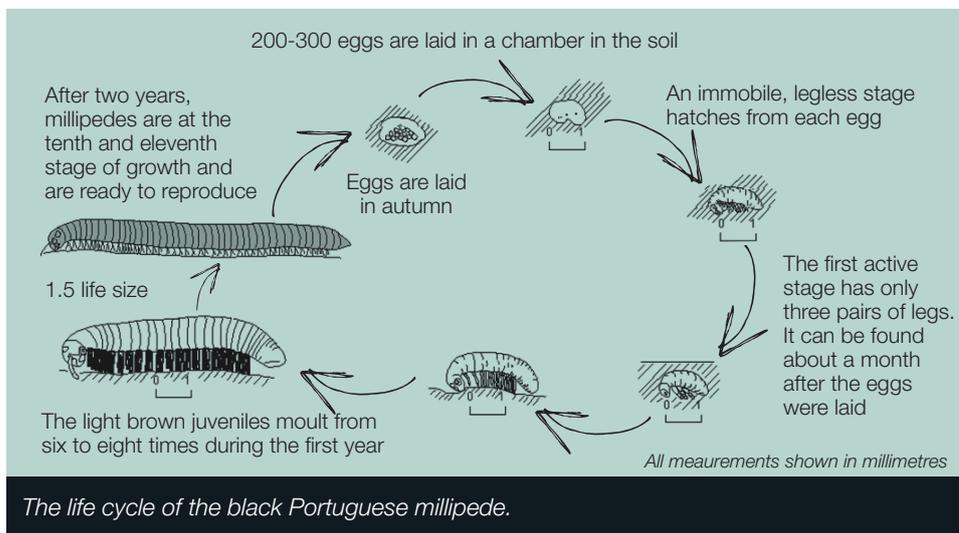
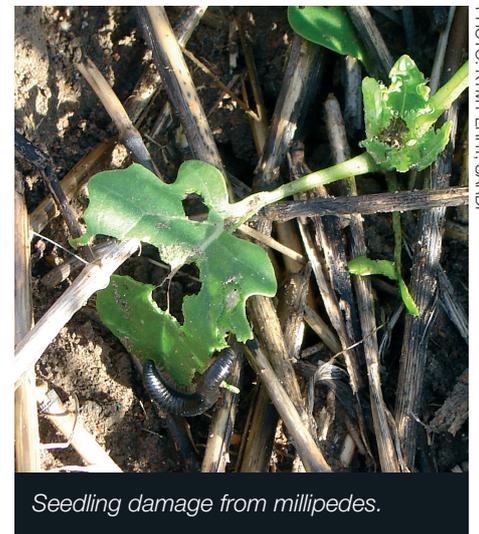


IMAGE: © WA AGRICULTURE AUTHORITY 2003 & PRISA



Seedling damage from millipedes.

PHOTO: KIM PERRY, SARDI

Cultural

Reducing the amount of trash and stubble over summer and early autumn is likely to be the most effective way to reduce millipede numbers.

Other factors to consider in management of crops and rotations include:

- ▶ Canola sown into paddocks with high organic matter have a greater risk of millipede damage.
- ▶ Burning stubbles may reduce millipede populations.
- ▶ Early sowing of high-vigour varieties at a higher seeding rate will help compensate for seedling losses from pest damage.

Biological

There are very few natural predators of millipedes because their bodies contain rows of glands that secrete a pungent yellowish fluid when they are agitated. This fluid makes millipedes distasteful to predators, such as birds.

A parasitic native nematode, *Rhabditis necromena*, attacks and kills millipedes by reproducing in the millipede's gut. However the use of nematodes is unlikely to be economically viable for broadacre crop release.

Some spiders and beetles will eat millipedes but these predators will not significantly reduce large populations.

SLATERS

Native and introduced slaters have become an increasing pest of broadacre crops and pastures but this has not always been the case.

The move to minimum or no-tillage and stubble retention is likely to have created a more habitable landscape in cropping paddocks for slaters.

Stubble provides a cool, moist habitat while crumbly clay soil surfaces and cracking clays aid their survival.

Identification

Slaters are also known as woodlice, sowbugs and pill bugs. They are crustaceans related to crabs, lobsters and prawns but are adapted to living on land.

They have a hard skeleton on the outside of their bodies, seven pairs of jointed legs, and two pairs of antennae. They perform an important recycling role in the environment.



PHOTO: A. WIEKES, cesar

Typical swarming behaviour of pest slater species *Australiodillo bifrons* moving across a wheat paddock.

Most slaters are detritivores, meaning they feed on decaying vegetation and associated fungi, as well as on dead animal matter such as insects. They can eat living plants, such as seedlings and root vegetables, but only rarely.

Slaters need damp conditions and will die if exposed to open and dry situations. They tend to be active at night when the risk of dehydration is low.

Female slaters keep their eggs in a pouch until the young hatch. Hatchlings then leave the parent and are completely independent. Slaters grow through a series of moults in which the outer rigid skeleton is shed, allowing growth to the next larger stage and finally to adult stage. When moulting, slaters shed in two stages – the top half of their body first followed by the remaining half two days later. During moulting, the slater is very vulnerable and must find shelter.

Species

There are a number of slater species in Australia including:

▶ Common slater

The common slater, *Porcellio scaber*, is widespread in Australia, originally introduced from Europe. The species can grow up to 20 millimetres in length and is usually pale grey however brown, yellow or orange hues have been observed.

▶ Pill bug

Armadillidium vulgare is a European species, introduced to Australia, which gets its name from its ability to roll into a ball when disturbed. It can grow up to 18 millimetres and is dark brown to black in colour.

▶ Flood bugs

Populations of *Australiodillo bifrons*, also called 'flood bugs', have increased in parts of New South Wales. *A. bifrons* is about 7-8 millimetres long and 4mm wide with an oval-shaped and flattened body, light brown



There are a number of slater species in Australia including (from top) Flood bug slater (*A. bifrons*); Common slater (*Porcellio scaber*) and the Pill bug slater (*Armadillidium vulgare*). When moulting, slaters shed in two stages – the top half of their body first followed by the remaining half two days later (above).

colour with darker irregular spots and a dark brown stripe down the middle of its back. It is a low-land swampy soil species adapted to marshy environments. Areas worst-affected in the past by *A. bifrons* are prone to flooding.

Slaters as pests

There is presently very little known about the biology of slaters and their potential to become a widespread agricultural pests in Australia.

Slaters can cause significant feeding damage, particularly on canola, leading to seedling mortality and stunted plant growth.

PHOTO: A. WIEKES, cesar

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Slaters have been observed crawling up wheat and oat seedlings and feeding from the tips of young plants. Research suggests some crops, such as chickpeas, are not susceptible to feeding damage but this is still to be proven.

In some situations, crops or parts of paddocks may need to be re-sown. Often symptoms resemble feeding damage caused by lucerne flea.

In particular, the flood bug has potential to cause rapid damage to crops due to its ability to swarm. A consistent mass of slaters moves along the soil surface, climbing trees or moving into logs or posts. Swarms can contain more than 100,000 individuals – sometimes up to one million – and include all life stages, from juveniles to adults.

The size of swarms varies and is likely to be influenced by the time of day, weather conditions and surrounding vegetation. Thousands of seedlings can be eaten in a very short time when swarms are large enough.

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The latest invertebrate pest-related issues and solutions in the GRDC Southern Region are available by subscribing to the free *PestFacts* services. The information services provide subscribers with pest reports and field observations on the appearance and distribution of invertebrate pests across south-eastern Australia. This information, along with advice and recommendations, is emailed to nearly 2000 individuals, organisations and businesses working with broadacre crops and pastures. Subscribe in SA by contacting Kym Perry, 08 8303 9370 or kym.perry@sa.gov.au and in Victoria and NSW by contacting Paul Umina 03 9349 4723 or email pestfacts@cesaraustralia.com

Damage

It is uncommon for slaters to attack broadacre crops but issues with slaters have increased considerably in the past five years. In south-eastern Australia, slaters have caused damage to wheat, oats, canola, lentils and pastures.

Slater feeding on plants results in an uneven rasping-type damage that can appear similar to slug and snail damage. They can chew the tops of emerging cotyledons or leaves of crop seedlings, leaving only the seedling stumps.

The presence of slaters, even in high numbers, in a paddock does not always mean crop damage will occur because slaters generally feed on decaying organic matter. Feeding on emerging crop seedlings is relatively rare. It is not known what makes slaters suddenly prefer to eat seedlings rather than organic matter.

In south-eastern Australia, damage has been reported in the medium and high rainfall zones including South Australia's Mid North and Yorke Peninsula, Victoria's Wimmera and Western Districts, and central New South Wales. In many cases – but not all – damage has been reported where there was an accumulation of stubble or other plant matter or cracked soils.

Management

Management options are limited after crop emergence so prevention is a key part of control.

Chemical

There are no insecticides registered to control slaters. Slaters are relatively unaffected by most foliar applications of synthetic pyrethroids and organophosphates to control other crop-establishment pests, even when applied at very high rates.

Cultural

Managing stubble is likely to be the most effective strategy to reduce slater numbers. Some growers have had success managing slaters ahead of canola rotations through burning crop residues.

USEFUL RESOURCES

MILLIPEDES:

Emerging issues with diseases, weeds and pests

Ground Cover Supplement Jan-Feb 2013, page 12
www.grdc.com.au/GCS102

SARDI Portuguese Millipedes Fact Sheet

www.sardi.sa.gov.au (search millipedes)

DAFWA Garden Note: Black Portuguese millipedes

www.agric.wa.gov.au (search millipedes)

SLATERS:

DAFWA Garden Note: Slaters and their control

www.agric.wa.gov.au/OBJTWR/imported_assets/content/pw/ins/hp/gn2004_15.pdf

MORE INFORMATION

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